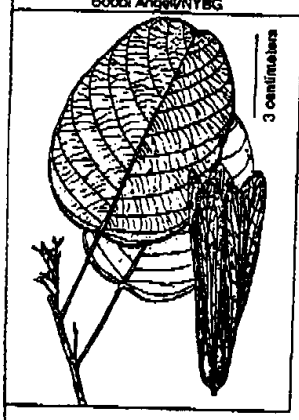
Biology

Old World tree has roots in New

Researchers recently confirmed that members of the tree family *Dipterocarpaceae*, common in Africa and Asia, grow in South America as well—a finding they liken to discovering, say, kangaroos in South America.

Scientists found the tree in southern Colombia in 1988 but identified it only this summer, says Enrique Forero of the New York Botanical Garden (NYBG) in New York City. It is a new genus and species, *Pseudomonotes tropenbosii*, and it grows abundantly in a small, isolated area of the Amazon River rain forest. Forero and his colleagues identified the tree primarily by the five unusually long, winglike sepals surrounding the fruit.

Bobbi Angell/NYBG



The discovery suggests that dipterocarps have existed for much longer than previously thought—even before the split of ancient landmasses over 80 million years ago, when South America and Africa began to drift apart, the group asserts.

In 1977, other researchers found a dipterocarp, which they named *Pakaraimaea dipterocarpacea*, in Guyana. But until the Colombian finding, some scientists had doubted whether the tree really ranked as a dipterocarp, says Forero.

The leaves and sepals of the newest dipterocarp.

Helping rare species strut their stuff

Countries where gorillas live in the wild stopped exporting the endangered animals to zoos in the United States in 1976. And some captive gorillas produce few or no offspring. As a result, the gorilla gene pool in the United States has become limited.

To increase genetic diversity in this population, researchers are turning to in vitro fertilization techniques developed for humans. In December, a lowland gorilla at the Cincinnati Zoo and Botanical Garden is expected to give birth to the first test-tube gorilla—and the first test-tube endangered primate—says zoo scientist Betsy L. Dresser. A gorilla at an Omaha zoo provided the sperm.

In vitro techniques enable researchers to take sperm and eggs from distant animals and create embryos that they can implant in a female or freeze for later use, Dresser explains.

Zoo scientists may one day import sperm from wild gorillas for use in captive creatures, she says, or even export zoo-grown embryos for implantation in wild animals.

In Kenya, zoo researchers have implanted embryos from bongos, a rare antelope, into the more common eland. The surrogates care for the babies as if they were their own flesh and blood, although elands don't share bongos' chestnut brown coloring, says Dresser. Eventually, researchers would like to use lowland gorillas as surrogate mothers for Rwanda's rare mountain gorillas. No mountain gorillas exist in captivity.

Angela Osborne/Cincinnati Zoo

Scientists have experimented with in vitro fertilization in cats, baboons, and rhesus monkeys. Antelopes are the only other endangered species to have had a test-tube baby, she says.

Gorilla Mata Hari awaits the birth of her test-tube baby.

Monkeying around with stem cells

Capable of living almost indefinitely in test tubes and retaining their ability to differentiate into any kind of tissue, embryonic stem (ES) cells can be placed back into a developing embryo without harming it. By manipulating the genes in a rodent's ES cells and reintroducing those cells into embryos, investigators have created mice with traits that mimic human diseases or that reveal the functions of proteins. Researchers also use ES cells to study embryonic development in mice.

Now, investigators believe they have isolated ES cells from rhesus monkeys, the first time this feat has been accomplished in a primate. The cells, isolated from 6-day-old monkey embryos, have survived in test tubes for a year without differentiating; moreover, the cells' DNA still appears normal, report James A. Thomson and his coworkers at the University of Wisconsin Regional Primate Center in Madison.

To further establish that they had isolated ES cells, the investigators injected the cells into mice. Multiplying and reacting to cues from the surrounding, mature tissue, the ES cells eventually produced cells with the characteristics of bone, brain, stomach, and skin, the researchers report in the Aug. 15 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

"The reason we're interested in ES cells is as an in vitro [test-tube] model of human development. The monkey cells should replicate it almost exactly," says Thomson. He notes that the primate ES cells should be particularly useful for studying placental and neural development, areas in which primates differ significantly from mice.

Thomson's group also notes that working with monkey ES cells should provide valuable experience for researchers who believe that transplantation of human ES cells, once found, could help treat or cure a variety of diseases.

Do songbirds sing of Alzheimer's?

The dulcet notes of songbirds do more than please the ear—they provide one of the best models of how the brain modifies connections between neurons in order to learn.

About 3 weeks after birth, songbirds begin to listen silently to the singing of a tutor, usually their father. After this period, which lasts about 2 weeks, the juvenile birds start to rehearse their song, apparently reinforcing the neural circuits established when they memorized it.

Researchers over the years have pinpointed specific regions of the avian brain crucial to these distinct phases of song learning. Now, investigators studying zebra finches have unearthed a protein, which they named synelfin, that may play a role in the memorization phase.

An area of the brain implicated in song memorization makes synelfin in large quantities until approximately 35 days after birth, report David F. Clayton and his coworkers from the University of Illinois at Urbana-Champaign in the August NEURON. Synelfin production in this area then falls dramatically, virtually disappearing by adulthood, they further report.

Adding to the suspicion that learning involves synelfin, Clayton's group notes two possible links between the protein and Alzheimer's disease, a neurodegenerative disorder that ravages memory. First, synelfin's shape resembles that of apolipoprotein E (apo E); scientists contend that possessing certain forms of apo E dramatically increase a person's chance of getting Alzheimer's. Second, researchers have recently found fragments of the human version of synelfin clumped together with a protein called beta-amyloid in the dense brain plaques that are a hallmark of Alzheimer's disease.

"I think the link [of synelfin] to Alzheimer's is very strong. Certainly, this is a protein that's at the scene of the crime," says Clayton.